LIVING AND DYING IN PARTICULATE AIR POLLUTION

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OUTLINE

1. What is PM?
2. The Death of John Doe
3. PM as an Air Pollutant
4. Remarks
MY BACKGROUND

• Tulsa – The Former Oil Capital of the World
• San Diego State U. of Rochester, Lovelace
• U.C. Irvine – The Oil Embargo and ARB
• 200 + Particle and Gas Toxicology Studies
• International Conferences on PM and Human Health
• Committees – NRC, NIH, NIOSH, EPA, IRB, etc.
WHAT IS PM?

- NAAQS Criteria Pollutant
- Particulate Matter (Mass)
- Weight Below Either 10 or 2.5 µm Diam. Cutoff
- Composition Not Considered
- Variable in Space, Time, & Composition
- Mixed Natural and Anthropogenic Material
- 25% Deposits in Lung
JOHN DOE’S RISK FACTORS

• Age, overweight, older adult
• Cardiovascular disease, diabetic
• URT infection
• Anxiety, unemployed
• Poor physical/mental status
• Heat wave inversion, no AC
THE DAY JOHN DIED

• Truck drove by
• Dog chased truck
• John chased dog uphill
• John collapsed and
• Died in ER, MI
WHAT KILLED JOHN?

- PM 2.5
- URT infection cigarettes pollen
- Obesity, CVD, and exertion
- Diabetes
- Anxiety, stress
- Low socioeconomic status
- etc.
PREVENTING HIS DEATH?

- Tighten air Quality Standards
- Re-route traffic
- Improve John’s general health
- Reduce cost of air conditioning
- Improve John’s socioeconomic status
- etc.
PM AS A METRIC - 1

- Not chemically defined
- Not stable in time or place
- Mixed man-made and natural pollutants
- Doses are miniscule
PM AS A METRIC - 2

- Several no-effect epi studies
- Very expensive to meet regulations
- Controls have public health tradeoffs
- Controls can have unpredictable effects on air chemistry
REMARKS

• PM is a poor metric
• PM 2.5 alone didn’t kill John
• Do risk analysis on decisions, not a single pollutant
• Consider all consequences of a decision
References:


